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## **Polystichum Andersoni and Related Species<sup>1</sup>**

WILLIAM R. MAXON

Among the genera of ferns probably none has been regarded as subject to greater subspecific variation than *Polystichum*. How much of this supposed polymorphism is due to high variability actually existing within the species and how much to a failure to recognize constant characters peculiar to like individuals from natural geographic areas is not altogether clear. It is clear, however, that some of the widely distributed types split up into readily recognizable forms, marked by good structural and vegetative characters, and that in many instances what might, with scant material, appear a chance variant is in reality a well characterized constant form throughout a given area, needing only to be studied in the light of ample collections to obtain recognition as a sharply defined species. The West Indian specimens, for example, had been characterized vaguely as belonging to a few variable species; yet a critical study of a large amount of material has shown<sup>2</sup> that for the most part the plants fall readily within the rather narrow limits of numerous species. These are mostly of restricted range; and although their distinguishing characters are sharply marked, it is not difficult to arrange them, on general resemblances, in natural groups whose members have obviously had

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<sup>1</sup> Published with the permission of the Secretary of the Smithsonian Institution.

<sup>2</sup> Contr. U. S. Nat. Herb. 13: 25-39. pls. 2-9. 1909.

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a common origin. In the matter of scant variation two exceptions are noted in *P. adiantiforme* and *P. triangulum*. The former is a very widely distributed plant of both hemispheres, and the latter an inherently variable species of wide extremes in leaf proportion.

The Polystichums of continental America offer greater difficulties, largely from lack of adequate material. The present paper deals with three forms ranging from Washington to Alaska. Two of these have been described by Mr. L. S. Hopkins as *P. Andersoni* and *P. Jenningsi*. The third, here characterized as new, is from Alaska. The three species differ among themselves much less than the West Indian species; but the characters given below seem to be distinctive and, in the absence of intermediate plants, to justify their acceptance, temporarily at least, as full species. As a group, they are nearest related apparently to *P. Braunii*, differing from that species in their simpler pinnae and more strongly aristate segments.

Fronds not proliferous, lacking scaly buds upon the rachis; pinnae mostly horizontal (those of the basal third somewhat deflexed), close, linear-oblong, their apices acutish to long-acuminate; segments spreading, oblong, oblong-ovate, or rhombic-ovate, mostly auriculate or subauriculate, subsessile to semiadnate, slightly or not at all decurrent. *1. P. alaskense.*

Fronds proliferous, 1 or 2 scaly buds invariably present on the rachis 4-10 cm. from the apex of the lamina; pinnae mostly ascending, more remote, narrowly elongate-triangular, tapering gradually from the base or near it, attenuate; segments oblique, of an elliptical type and (excepting the basal ones) adnate or semiadnate, long-decurrent.

Lamina lance-elliptic, gradually reduced toward the base, the basal pinnae about one-third as long as the middle ones; middle pinnae distinctly elongate-triangular from the base, 4 or 5 times as long as broad at their middle. *2. P. Jenningsi.*

Lamina narrowly lance-oblong, only slightly reduced downward, the basal pinnae one-half to two-thirds as long as the middle ones; middle pinnae much more slender, very narrowly triangular, narrowed above the elongate basal segments, 7 or 8 times as long as broad at their middle. *3. P. Andersoni.*

**1. *Polystichum alaskense* Maxon, sp. nov.**

Rhizome stout, ascending or decumbent, very densely paleaceous, the scales rich chestnut brown in mass, yellowish brown individually, concolorous, thin, translucent, linear-attenuate to broadly ovate and long-acuminate, irregularly denticulate, 1.5–2 cm. long. Fronds several, 50–90 cm. long, apparently forming a close crown; stipes stout, 8–22 cm. long, strongly arcuate at the blackish base, deeply sulcate, copiously paleaceous, the scales extremely variable, minute and linear to ovate-acuminate and 1.5 cm. long, denticulate; lamina 30–70 cm. long, 9–18 cm. broad near the middle, narrowly linear-lanceolate to linear-ob lanceolate, long-attenuate at both extremities, 3–5 cm. broad at the base, subpinnate; rachis densely and persistently paleaceous, the scales mostly small, linear to lanceolate; pinnae 25–40 pairs, close, mostly alternate, spreading (those of the basal third somewhat deflexed), straight or nearly so, the middle ones the largest, these 4.5–9 cm. long, 1.5–2.5 cm. broad, linear-oblong, acutish to long-acuminate, nearly pinnate in their basal half, pinnately cleft toward the apex; larger segments 10–16 pairs, spreading, close or contiguous, oblong-ovate or rhombic-ovate, auriculate or mostly subauriculate, subsessile to semiadnate and short-decurrent, serrate, the teeth curved and mostly appressed, tipped with stiff whitish awns, these 1–2 mm. long, spreading or more commonly incurved over the upper surface of the segment; midribs and lower surfaces fibrillose-paleaceous, the upper surface sparingly so, glabrescent; sori 3–6 pairs, large, nearer the midrib than the margin, borne on the basal branch of the oblique, mostly once or twice forked veins; indusia large, persistent, orbicular, pale with a darker center, erose-dentate, the teeth gland-tipped. Leaf tissue rigidly herbaceous, opaque, dull dark green above, paler beneath.

Type in the U. S. National Herbarium, no. 277737, collected at Helm Bay, Cleveland Peninsula, Alaska, in rich soil of forested mountain slope, July 19, 1901, by J. B. Flett (no. 1917).

Besides a second frond of the type collection, the following additional specimens are in the National Herbarium:

ALASKA: Sitka, *C. V. Piper* 4561; *J. P. Anderson* 2; *H. C. Cowles* 1076. Yes Bay, moist mountain slopes, *M. W. Gorman* 242, 1728. Head of Russell Fiord, *Coville & Kearney* 942. Point Gustavus, Glacier Bay, *Coville & Kearney* 724. Without special locality, *W. H. Dall*.

The presence or absence of a proliferous bud upon the rachis seems here, as in the West Indian species, a character of first importance. The specimens above cited were mostly determined as *P. Braunii*, which likewise lacks this distinctive structure. *Polystichum Braunii* occurs not infrequently in Alaska, sometimes in company with *P. alaskense* (e. g., Sitka, *Bischoff, Evans* 164; Yes Bay, *Gorman* 178) and is known to the writer from a single locality in British Columbia (Salmon River, Ymir District, *W. C. Sandercock*; *Herb. Canadian Geological Survey*, no. 89854).

2. *POLYSTICHUM JENNINGSI* Hopkins, Ann. Carnegie Mus. **11**: 362. *pl. 37*. 1917.

*Type*.—Collected along bank of the Nisqually River, near Longmire Springs, Rainier National Park, Washington, August 18, 1915, by O. E. and Grace K. Jennings (no. 9960); in the Herbarium of the Carnegie Museum.

Agreeing with the type in all essential characters and differing only in their lesser size and much shorter stipes are the following specimens, all in the National Herbarium:

WASHINGTON: Horse Shoe Basin, Okanogan County, "moist soil of thickets in dead woods near the snow

limit," Sept. 1897, *A. D. E. Elmer* 707; same locality, "rocky slopes, alt. 5000 ft.," Aug. 20, 1897, *M. W. Gorman* 709. Mount Rainier, alt. 4000 ft., "old moraines, in shade of alders," Aug. 28, 1902, *J. B. Flett* 2020.

The affinity of this species is clearly with *P. Andersoni*, from which, however, it is distinguishable by the characters stated in the key and under that species, below.

3. **POLYSTICHUM ANDERSONI** Hopkins, Amer. Fern

Journ. 3: 116. pl. 9. 1913.

*Type*.—Collected at Elk River, Strathcona Park, Vancouver Island, British Columbia, Aug. 2, 1912; in Herbarium of the Geological Survey of Canada, no. 83121.

In addition to the actual type the writer has examined several fronds taken from the original plant, which was transplanted to a garden at Sidney, B. C. Through the courtesy of Mr. James M. Macoun three of these have been placed in the National Herbarium. A single additional collection has been seen:

BRITISH COLUMBIA: North Fork of the Illecillewaet, alt. 3500 ft., Aug. 26, 1904, *C. H. Shaw* 566.

Supplementing the characters given in the key, it may be mentioned that *P. Andersoni* is a more rigid plant than *P. Jenningsi* and has the pinnae decidedly more slender, even the basal pinnae being very narrowly triangular and attenuate, as opposed to the short-triangular or oblong-triangular, acutish basal pinnae of *P. Jenningsi*. The teeth of the segments are less curved also; and the bristle-like tips arise more abruptly, appear longer, stiffer, and more slender, and mostly diverge more widely. The upper surface of the segments is not "smooth," as stated in the remarks following the original description of *P. Jenningsi*, but is scantily fibrillose-scaly, the few minute scales in both species being readily abraded, however.

WASHINGTON, D. C.